5.8 Hydrology/Water Quality

This analysis focuses on potential impacts to water quality, groundwater supplies, drainage patterns, runoff, stormwater drainage systems, 100-year flood hazard areas, and inundation associated with the adoption and implementation of the proposed General Plan, adoption and implementation of the revised Zoning Code and Subdivision Code, and adoption and implementation of the Magnolia Specific Plan, as these actions have the potential to affect hydrology and water quality. The Citywide Design Guidelines and Sign Guidelines only address site planning, building design and community aesthetics and are thus not considered relevant to this analysis.

Water supply issues are addressed in Section 5.16 (Utilities and Service Systems).

Environmental Setting

Surface Hydrology

The City of Riverside is located within the Santa Ana Region (Region 8) of the California Regional Water Quality Control Board (RWQCB). The Planning Area is located within the RWQCB Middle Santa Ana River Watershed Management Area and in the Santa Ana Hydrologic Unit. In the Planning Area, surface drainage generally flows in a northerly direction into the Santa Ana River.[1] Nine principal drainage basins in the City of Riverside flow into the river: University, Box Springs, Central, Monroe, La Sierra, Southwest Riverside, Mockingbird Canyon, Edgemont, and Highgrove.

The Riverside County Flood Control and Water Conservation District (RCFCWCD) is responsible for regional flood control and drainage facilities. The City maintains local facilities that tie into RCFCWCD regional system.[2] Local drainage facilities, consisting mostly of underground closed conduits and storm drains located primarily in developed portions of the Planning Area, collect stormwater and convey it to regional facilities, including the Santa Ana River.

Sampling and computer modeling for the Santa Ana River Basin by the RWQCB indicate that levels of total dissolved solids/minerals (TDS) and nitrogen (mainly in the form of nitrate) in the Santa Ana River exceeded water quality objectives or would do so in the future without suitable management. The Santa Ana Watershed Project Authority (SAWPA) is managing a study supported by the Nitrogen/TDS Task Force, a consortium of water supply and wastewater management agencies in the region. The Task Force is studying

[1] Santa Ana Regional Water Quality Control Board. Date accessed: August 9, 2004, from http://www.swrcb.ca.gov/rwqcb8/

[2] Riverside County Flood Control and Water Conservation District. Date accessed: August 9, 2004, from http://www.floodcontrol.co.riverside.ca.us/default.asp

nitrogen and TDS management issues, including water quality objectives and regulatory approaches to recharge and wastewater reclamation. [3]

Groundwater Resources

Local groundwater basins are recharged from natural runoff, treated wastewater, and imported water. Runoff from local rainfall is the main source of recharge for the smaller basins. In 2002, the City met 99 percent of its water needs from underground resources, while receiving only 1 percent from the Western Municipal Water District (WMWD).[4] The annual production of the groundwater basins that support the City of Riverside is roughly 173,600 acre-feet per year.

Water resources throughout Riverside County are sustained by significant groundwater basins, which are used as reservoirs to store water during wet years and overdraft stored water in dry years. Groundwater conditions in these basins are influenced by natural hydrologic conditions such as percolation of precipitation, groundwater seepage and ephemeral stream flow from the nine arroyos that traverse the Planning Area. The City has water supply wells in the Bunker Hill, Rialto-Colton, Riverside North, Riverside South and Arlington groundwater basins some of which are located outside of the Planning Area. The City extracts domestic water from the Bunker Hill, Riverside North, and Riverside South basins through 51 wells operated by Riverside Public Utilities (RPU). Water for domestic use is not extracted from the Arlington and Rialto-Colton basins because of poor water quality and lack of transmission lines. Only irrigation quality water is supplied from the wells in Riverside North, Riverside South, and Colton basins.

Inundation

Most of the annual rainfall in the region occurs in the winter. Flooding in the City of Riverside could result from intense storms or as the result of dam failure. The U.S. Army Corps of Engineers is responsible for dam safety and conducting routine inspections. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) show that portions of the Planning Area fall within the 100-year flood zone. Areas subject to flooding during a 100-year storm event are depicted in **Figure 5-13.** Flood hazard risks are greatest in the vicinity of the Santa Ana River and several dams, including Mary Street Dam, Alessandro Dam, Prenda Dam, Woodcrest Dam, Mockingbird Canyon Dam, Harrison Dam, Cajalco Dam and Lake Evans Dam.

Due to the City's distance from the ocean, there is no foreseeable risk of tsunami (tidal wave) inundation. Seiches are oscillations in enclosed bodies of water caused by seismic waves. Existing development is subject to hazards from seiches in reservoirs such as Lake Matthews and Lake Evans and other small water bodies. Mudflows associated with erosion may also occur in portions of the community.

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[3] Santa Ana Regional Water Quality Control Board. Revised May 2004. *Watershed Management Initiative Chapter.*

[4] City of Riverside, Public Utilities. Date accessed from August 20, 2004, from http://www.riversideca.gov/utilities/basinmap.htm

Figure 5-13
Flood Prone Areas (11x17, color)

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Thresholds for Determining Level of Impact

For the purposes of this EIR, a significant impact will occur if Project implementation will:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- Substantially alter the existing drainage patterns in the City, including through the alteration of the course of a stream or river in a manner which would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage patterns in the City, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Be subject to inundation of seiche, tsunami or mudflow.

Environmental Impacts

Surface Hydrology

Development pursuant to Project policies and regulatory standards will result in the addition of up to 38,100 dwelling units and 39.6 million square feet of non-residential construction over the 20-year horizon of the General Plan. The updated General Plan introduces new land use designations that will enable significant increases in housing and population to occur, but in a focused manner that allows more efficient use of existing urban infrastructure in already urbanized areas. The new designations are intended to permit growth focused on infill areas along the City of Riverside's major transportation corridors.

The overall impact on drainage patterns in the City of Riverside from new development due to the Project will be less than significant since most development will occur within infill areas of the City that are already fully urbanized. Future development pursuant to the Project, especially on presently undeveloped land, will increase the amount of impervious surfaces. The Project does not involve discharge into surface waters.

No alterations to streams or rivers will occur as a result of Project implementation. The Santa Ana River Task Force has recommendations for the River including plans for recreational development along the River. These recommendations would have the potential to alter drainage patterns in the Planning Area, but the exact impacts to the Planning Area cannot be determined until the Santa Ana River Task Force plans are submitted and approved for development.

The RWQCB achieves water quality objectives primarily through the development, issuance and enforcement of waste discharge permits. Effluent limits are the primary mechanisms for controlling discharges of pollutants to receiving waters. The RWQCB issues Federal National Pollutant Discharge Elimination System (NPDES) permits for discharges to surface waters. Under the NPDES program, effluent limits are developed based on applicable technology and water quality standards.

The City will require that each individual development project complies with existing State Water Quality Control Board and City stormwater regulations, including compliance with NPDES requirements related to construction and operation measures to prevent erosion, siltation and transport of urban pollutants. The Santa Ana Drainage Area Management Plan provides a selection of Best Management Practices (BMPs), as required by NPDES, which are specific to the Santa Ana River watershed.[5] Refer to Mitigation Measure HW-1 below for a list of NPDES regulations to which new development projects must adhere. All new developments will undergo individual City review and will be required to comply with the RWQCB NPDES Permit No. CAG998001, which sets forth BMPs for new development and redevelopment projects.

Urban runoff will be conveyed by local drainage facilities from the Project area to regional drainage facilities, including the Santa Ana River channel. Stormwater containing urban pollutants (e.g., sediments, nutrients, microbes, and toxic metals and organics) from the Project area conveyed to the Santa Ana River channel has potential to impact groundwater resources in the Riverside South, and Arlington groundwater basins. The impact to urban runoff will be addressed through the listed General Plan objectives and polices below, NPDES, and State and County BMPs for stormwater.[6,7] Stormwater BMPs will ensure minimal pollutant discharge and stormwater drainage system impacts from new

[5] Riverside County Flood Control and Water Conservation District. February, 2003. *Santa Ana Regional Drainage Area Management Plan.*

[6] California Stormwater Quality Association, January 2003. *Stormwater Best Management Practice Handbook for New Development and Redevelopment*, prepared by Camp Dresser & McKee and Larry Walker Associates.

[7] Riverside County Flood Control and Water Conservation District. July 6, 2004. *Riverside County Stormwater Quality Best Management Practice Design Handbook.*

developments both within the City and its sphere of influence. Moreover, new developments pursuant to the Project will be reviewed by the City and be required to submit storm drainage plans compatible with the RCFCWCD master drainage plans.

The General Plan includes the following objectives and policies, the adherence to which will reduce potential environmental impacts to urban runoff:

Objective LU-2: **Recognize and enhance the Santa Ana River's multiple functions: a place of natural habitat, a place for recreation and a conveyance for stormwater runoff.**

Policy LU-2.2: Utilize the 2004 Santa Ana River Task Force Report in planning, programming and implementing environmental and recreational improvements to the River area.

Objective LU-2: **Recognize and enhance the Santa Ana River's multiple functions: a place of natural habitat, a place for recreation and a conveyance for stormwater runoff.**

Policy LU-2.1: Cooperate and collaborate with Riverside County in developing recreational opportunities along the Santa Ana River.

Policy LU-2.2: Utilize the 2004 Santa Ana River Task Force Report in planning, programming and implementing environmental and recreational improvements to the River area.

Objective LU-5: **Preserve and protect the natural integrity of Riverside's arroyos.**

Policy LU-5.1: Minimize public and private development in and in close proximity to any of the City's arroyos.

Policy LU-5.3: Ensure that any new bridges proposed to cross any of the City's major arroyos are span bridges that minimize disturbance of the ground and wetland area below. At grade, fill-and-culvert type bridges are strongly discouraged in major arroyos.

Policy LU-5.4: Continue to require open space easements in conjunction with new development to be recorded over arroyo areas, per the City's Grading Code.

Policy LU-5.5: Work with Riverside County to develop, implement and maintain comprehensive management plans for arroyo protection management.

Policy OS-10.6: Continue to enforce RWQCB regulations regarding urban runoff.

Policy OS-10.7: Work with the RWQCB in the establishment and enforcement of urban runoff water quality standards.

Policy OS-10.8: Cooperate with Riverside and San Bernardino Counties and adjacent jurisdictions in the review and approval of new developments which affect the quality and quantity of basin-wide groundwater and surface water resources.

Policy OS-10.9: Evaluate development projects for compliance with NPDES requirements, and require new development to landscape a percentage of the site to filter pollutant loads in stormwater runoff and provide groundwater percolation zones.

Objective PF-4: Provide sufficient levels of storm drainage service to protect the community from flood hazards, and minimize the discharge of materials into the storm drain system that are toxic or which would obstruct flows.

Policy PF-4.1: Continue to fund and undertake storm drain improvement projects as identified in the City of Riverside Capital Improvement Plan.

Policy PF-4.2: Continue to cooperate in regional programs to implement the National Pollutant Discharge Elimination System program.

Adherence to and implementation of the above objectives and policies will substantially lessen stormwater runoff impacts at a programmatic level. However, the mitigation measure set forth below is required to ensure that future development projects comply with relevant regulations and that impacts remain below a level of significance.

Groundwater Resources

Development pursuant to Project policies and regulatory standards will result in the addition of up to 38,100 dwelling units and 39.6 million square feet of non-residential construction over the 20-year horizon of the General Plan. According to the Riverside Public Utilities (RPU) Urban Water Management Plan (UWMP), projected domestic water demand is expected to increase from 77,626 acre-feet per year in 2000 to 94,886 acre-feet per year in 2020. The projected water demand (94,886 acre-feet) is well below the water supply anticipated to be available to the RPU in that year (128,600 acre-feet). The RPU and Western Municipal Water District (WMWD) Urban Water Management Plans project that adequate water supplies will be available for the Planning Area through the year 2020.[8,9] The Project does not anticipate significant future development of areas served by WMWD; thus, impacts on groundwater resources will be less than less than significant.

The General Plan includes the following objectives and policies, the adherence to which will reduce potential environmental impacts to groundwater resources:

[8] City of Riverside Public Utilities Department. 2002. *Urban Water Management Plan*.

[9] Western Municipal Water District. 2000. *Urban Water Management Plan*.

Objective OS-10: Preserve the quantity and quality of all water resources throughout Riverside.

Policy OS-10.1: Support the development and promotion of water conservation programs.

Policy OS-10.2: Coordinate plans, regulations and programs with those of other public and private entities which affect the consumption and quality of water resources within Riverside.

Policy OS-10.3: Provide incentives such as structured water rates to encourage residential and businesses customers to use less water.

Policy OS-10.4: Develop a recommended native, low-water-use and drought-tolerant plant species list for use with open space and park development. Include this list in the landscape standards for private development.

Policy OS-10.5: Establish standards for the use of reclaimed water for landscaping.

Policy OS-10.8: Cooperate with Riverside and San Bernardino Counties and adjacent jurisdictions in the review and approval of new developments which affect the quality and quantity of basin-wide groundwater and surface water resources.

Policy OS-10.10: Protect aquifer recharge features and areas of important aquifers from degradation of water quality and reduction of recharge.

Policy OS-10.11: Monitor the quality and quantity of groundwater and surface water resources and consider revisions to the General Plan's policies if monitoring identifies significant reductions in water quality.

The policies listed above will significantly lessen impacts directly related to the Project. Individual development proposals will continue to comply with existing City standards and practices regarding water supply. These standards and practices include:

- Review all development projects in consultation with the applicable water district or purveyor to ensure adequate water supplies, treatment, and distribution capacity for projects without negative impact to the community. Sections 10910-10915 of the California Water Code also require preparation of a 20-year Water Supply Assessment for certain projects, demonstrating available water supplies exist to support development.

- Implement CEQA when reviewing future development projects to evaluate potential impacts on agricultural resources, biological resources, cultural and paleontological resources, energy supply, scenic resources, mineral resources, water resources, and water quality.

With adherence to and implementation of the above policies and practices, impacts to groundwater resources will be less than significant at the programmatic level.

The significance of impacts to groundwater resources resulting from specific future development projects will be evaluated on a project-by-project basis. If project-level impacts are identified, specific mitigation measures will be required per CEQA.

Inundation

Project implementation will not place housing or other structures in a 100-year flood hazard area; in fact, the Project discourages development of sensitive facilities in these areas. In general, flood-prone areas are designated for open space and recreational uses rather then sensitive facilities. The City will review all development proposals to assess if a project is proposed in a flood hazard area. Residents of the City will not be exposed to any significant risk involving flooding from dam or levee failure due to implementation of the Project, since the majority of the new development proposed by the 2004 General Plan will occur as infill growth outside of known flood hazard areas.

Because the City of Riverside is located more than 40 miles inland inundation from a tsunami is not foreseeable. However portions of the Planning Area are subject to seiches, especially near reservoirs and other small water bodies.

Significant mudflows associated with erosion and fire damage may also occur near the Santa Ana River and the nine arroyos that traverse the Planning Area. The General Plan has designated these areas for open space and recreation uses. As stated in Objective LU-5 above, the arroyos of the City of Riverside will be protected and preserved in their natural state. Limited nuisance mudflows may occur throughout the City in the event of an extreme storm resulting in erosion of urban landscaping. The City will require standard construction BMPs to control erosion and protect areas with steep slopes for all new developments.

In sum, potential impacts at the programmatic level associated with inundation from tsunamis, seiches and mudflows will be less than significant.

The General Plan includes the following objective and policies, the adherence to which will reduce potential environmental impacts from flooding and dam inundation:

Objective PS-2: Reduce potential flood hazards within Riverside.

Policy PS-2.1: Reduce flood risks for residents and businesses within urbanized areas.

Policy PS-2.2: Encourage flood control infrastructure that does not reduce the natural character or limit the use of the site.

Policy PS-2.3: Minimize additional flood risk exposure in developing areas.

Policy PS-2.4: Identify existing facilities located in the one-hundred-year floodplain, particularly bridges and potential emergency access routes.

Policy PS-2.5: Encourage flood control techniques along the Santa Ana River that are harmonious with potential recreational uses in the area.

Policy PS-2.6: Create and maintain evacuation routes for areas that could be affected by flooding or dam failure, with special emphasis on critical and emergency facilities.

Adherence to and implementation of the policies listed above will significantly lessen impacts directly related to the Project. In addition, the following City standards and practices help minimize potential impacts related to flooding. These standards and practices include:

- Require engineering studies to determine flood control facility requirements for future development projects. Ensure analysis distinguishes between local (City maintained) flood control facilities and regional facilities (maintained by the US Army Corps of Engineers, Santa Ana Watershed Project Authority or Riverside County Flood Control and Water Conservation District). Require that study recommendations be incorporated into the design of these projects. Require the dedication of necessary right-of-way and construction of flood control facilities for all development projects.

- Coordinate with the US Army Corps of Engineers, SAWPA and the RCFCWCD to ensure regularly scheduled maintenance of regional flood control channels and completion of necessary repairs. Coordinate review of future development projects to identify potential impacts to regional flood control facilities, necessary flood control improvements and establish installation programs for improvements.

Adherence to and implementation of General Plan policies and City practices related to wastewater reduction and infrastructure identified above will yield less than significant impacts at the programmatic level.

Mitigation Measures

HW-1 Prior to making land use decisions, the City will required project applicants to utilize available methods to estimate increases in pollutant loads and flows resulting from future development subject to NPDES regulations. In addition, project applicants shall demonstrate accomplishment of the following NPDES objectives:

- Use of structural and non-structural Best Management Practices (BMPs) to mitigate projected increases in pollutant loads and flows
- Minimized pollutant loading flow velocity during and after construction
- Minimized amounts of impervious surfaces and directly connected impervious surfaces
- Maximized on-site infiltration and runoff and temporary on-site retention areas
- Limited disturbance of natural water bodies and natural drainage systems
- Pollution prevention methods, source controls and treatment using small collection strategies located at or as close as possible to the source

No mitigation is required with regard to groundwater resources and inundation, as impact is less than significant.

Level of Impact after Mitigation

With adherence to and implementation of the above-listed General Plan policies and the mitigation measure, as well as standard Federal, State and City regulations, the impact to surface hydrology will be less than significant at the programmatic level. The significance of impacts to surface hydrology resulting from specific future development projects will be evaluated on a project-by-project basis. If project-level impacts are identified, specific mitigation measures will be required per CEQA.

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